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ON A CHARACTERISTIC PECULIARITY IN THE FORM OF THE FEMALE SKULL, AND ITS SIGNIFICANCE FOR COMPARATIVE ANTHROPOLOGY.*

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THE influences which, apart from intermixture, effect certain modifications—"disturbances" they might be called—are of various kinds. The most effective are, beside the artificial appliances for the purpose of altering the cranial form, pathological conditions, which give rise to premature synostosis, and thus produce forms which have frequently been mistaken for race-types. But individually, age and sex also modify in various manners the typical form of the cranium, and may, if they accidentally appear before us in a comparatively large number, cover or obliterate the typical form. Of these latter influences the most important, namely, those of sex, have hitherto been overlooked. The differences of the female skull from the male lie partly in the different quality of the osseous surface, and partly in the difference of the absolute, but specially of the relative size of the skull and its parts.

With reference to the first, the female cranium differs from the male by the same characters which distinguish the female skeleton from the male skeleton. First, we notice the lesser development of the processes serving for the attachment of the muscles in the skeleton, and with the development of which they keep pace. The difference is specially perceptible in the mastoid processes, the temporal and cervical line, and the ridges on the lower jaw. We further find that in the male skull the protuberances of the osseous cavities are more developed, as is seen in the superciliary arch produced by the frontal cavities. We may look upon this difference as similar to that greater development of the whole respiratory apparatus in the skeleton of the male, and I therefore agree with C. Vogt,† that the development of the superciliary arch must be considered only as an individual and sexual, and not as a race-character. The comparison of about 100 modern South-German skulls, presented in this respect the most striking differences. That in uncultured races individual differences obtain much less, is well known; and hence, sometimes may easily be taken for a race-character, which, with the progress of individual differen-

* This paper is translated from the *Archiv für Anthropologie*.

† *Vorlesungen ueber den Menschen*, 11.

tiation, is no longer so. Corresponding with the greater approach of the female skull towards the infantile form, the ossification points, the tubera frontalia and parietalia, are, as a rule, more developed in the adult female than in the male.

With regard to the dimensions, it has always been accepted that the female skull is absolutely smaller than the male skull; but accurate information, derived from a great number of measurements, we find, for the first time, in Welcker only.* We find, accordingly, that the horizontal circumference of the female skull to that of the male is $= 96.6 : 100$; the capacity $= 89.7 : 100$. With reference to the proportion of the skull to the rest of the skeleton in both sexes, we possess, to my knowledge, but few data by anatomists. Soemmering† says that in the male body, the head in proportion to the rest of the skeleton, is in weight $= 1 : 8$ or 10 , and in the female, $= 1 : 6$, and that it is, therefore, relatively larger in the female. Accurate measurements are yet wanting; but the statements of artists‡ confirm it, and the entire habitus of the female agrees with it.

But what is more important for our object is the proportion of the cranium to the face as a whole, and that of the separate parts. Anatomical literature contains very little on this subject; and it is only very lately that Welcker has undertaken comparative measurements, and in his work, cited above, has delineated the differences of the male and female skulls by so-called cranial nets. But all peculiarities cannot be expressed in this way, and to show them is the object of this paper, which, it is hoped, will supplement the delineations of Welcker.

The characteristic physiognomy of the female skull consists, apart from the above-mentioned peculiarities of the surface and size, chiefly in the following characters:—

1. In the smallness of the facial parts in comparison to the cranium. That the facial part is smaller, has been already observed by Soemmering§ and Ackermann.|| Welcker points out the small jaws and large orbits. Artists have long noticed this circumstance. According to Schadow, the facial length (from the upper margin

* *Untersuchungen über Bau und Wachsthum des Menschlichen Schädels*, Leipzig: 1862.

† Vom Hirn und Rückenmark. Mainz: 1788.

‡ According to Schadow (*Polyclet oder von den Maassen des Menschen*: 1854), the female body has $7\frac{1}{2}$, and the male 8 lengths of the head.

§ *Anatomie*, p. 82.

|| *Ueber die Körperliche Verschiedenheit des Mannes vom Weibe ausser den Geschlechtstheilen*. Coblenz: 1788.

of the orbit to the lower ridge of the chin) amounts in man to 5", in the child $3\frac{1}{2}"$, in the female $4\frac{1}{2}"$. The facial oval thereby appears in the female shorter, rounder, more child-like. The female character is in this, as in several other respects, approaching that of a child; woman, in fact, holds an intermediate position between man and child.

2. There is another peculiarity connected with this, to which Welcker has first drawn attention, and which belongs both to the female and the infantile skull, namely, the predominance of the cranial roof over the cranial basis. The proportions are, according to Welcker, as follows:—

(a). The *Linea naso-basilaris* (n. b.) (drawn from the fronto-nasal suture to the anterior edge of the occipital foramen) is to the whole length of the cranial vault in the male = 100 : 404; in the female = 100 : 421. According to my own measurements of a number of well-formed male and female South German skulls, the same line, putting the length of the whole arch = 100, was, in the male 27·1, in the female 26·7.

(b). As regards the transverse circumference of the calvaria, the proportion, according to Welcker, of the basal part of it (*Linea auricularis*, the distance between the edges of the zygomatic processes above the aural apertures) is to the upper part of the transverse circumference (measured with the tape from the above-mentioned point across the cranial arch) in the male = 100 : 245; in the female = 100 : 247.

(c). Finally, according to Welcker, the space between the frontal and parietal protuberances, called by him "the superior cranial square," predominates over the inferior cranial square (between the frontal and zygomatic processes) in women. The first-named space is to the latter in the male = 100 : 92; in the female = 100 : 83.

3. A third and, in my opinion, essential character, and which cannot fail to strike us at first sight, is the lesser height of the cranium. Welcker has also drawn attention to this. According to this author, the length is to the height of the skull in man = 100 : 37·9; in woman = 100 : 70·1.

Weissbach* also looks upon the lesser height of the cranium as characteristic of the female skull. According to my measurements of 25 well-formed male and female crania from the Black Forest,† the height and length index (length = 100) was in the male 83·9; in the female 79·4.

* *Beiträge zur Kenntniss der Schädelformen Oesterreichischer Völker.*—*Medic. Jahrbuch des Oest. Staats*, v. xx: 1864.

† Ecker, *Crania Germanica*, p. 83.

4. This character of the lowness of the cranium becomes the more striking, as it is generally attended by another peculiarity, that of a greater flatness of the roof, especially of the parietal region. I find this character well pronounced in the majority of our modern native skulls, and also in the crania of old Franconian and Alemannic graves.* This difference in the latter appears to me still greater, as the male skulls frequently present a sagittal elevation, which is absent, or but insignificant, in the female skulls.

It might be interesting to ascertain whether in races in whom the sagittal crest is greatly developed, there obtains, in this respect, a difference between the sexes. I am led to think so. We have, in our museum, two skeletons of natives of South Australia, from the district of the Murray river, which I am indebted for to the kindness of a former pupil of Dr. Vogt, in Greenock (South Australia). Both skeletons belonged to young persons apparently of the same age. The cranium of the male presents a well-marked sagittal elevation, which is nearly wanting in the female. This observation is allied to the well-known fact that the female gorilla skull differs from the male by the absence of this crest, and other analogous facts.

5. From this predominance of the cranial roof over the cranial base, there results, among other facts, a form of forehead which is equally, if not more so, seen in the child, namely, a perpendicular position, which, in the latter, passing the perpendicular line, projects on the top. This straight frontal line imparts something noble to the female head; and, according to Camper's facial angle, the cranium of a newborn child occupies a higher rank than that of an adult; and so does, by the same measurement, the female cranium occupy a higher rank than that of the male. But whether this perpendicular frontal profile (which might be called orthometopy) is connected with a perpendicular position of the facial profile (orthognathism) is a different question. At first sight this certainly seems to be the case; to myself, at least, the majority of female skulls appeared to be distinguished by orthognathism. Weissbach also (*loc. cit.*) cites, besides the lesser capacity, the lowness, the smaller facial part, the strongly pronounced orthognathism, as a chief character of the female skull; but the measurements of Welcker (*loc. cit.*) are opposed to these views. According to these the female skull shows a stronger prognathism and a more stretched base (a larger sellar angle) than the male; and placed according to the size of the sellar and nasal angle, the skulls form a different series than when placed according to Camper's facial angle. According to the latter, they form a descending series: child,

* A number of crania marked by Davis and Thurnam (*Cran. Brit.*) as platycephalic, are manifestly female crania.

woman, man; according to the former, man, woman, child. Welcker himself observes, however, on this point, that the predominance of the calvaria of the female over the cranial base (the absolute and relative shortness of the tribasilar bone), is in contradiction with these measurements, whilst the more stretched structure of that bone is in harmony with them.

6. From the preceding peculiarities, in connection with some others to be mentioned presently, there results, on the whole, a characteristic form, which will be better understood by a glance at the delineations* (fig. 27-35) than by any minute description. The flat vertex seems abruptly to pass into the perpendicular frontal line, so that the transition from forehead to vertex does not form an arch, but a slight angle. In the same way, though less pronounced, the flat vertex passes into the occiput by a kind of angular flexion. This, at least, is perceptible in our brachycephalic skulls, but certainly much less so in dolichocephalic skulls with developed occiput (*e.g.*, the Scandinavian, or old Franconian and Alemannic skulls). I shall designate these angular transitions, the frontal and occipital angles. On comparing with this the profiles of characteristic male heads, we find the higher and arched cranium pass gradually, and in a gentle curve, into the forehead, and also the occiput.

For the better understanding, I give some outlines of well-formed male and female crania. Fig. 27 is the skull of a female, æt. 20, from the neighbourhood of Freiburg, (copy of Tab. vi of my *Crania Germaniæ*). Fig. 28, the skull of a woman, from a Franconian grave near Altlussheim, (*ibid.* Tab. xiii.) Fig. 29, the skull of a well-made man, from the Black Forest, (*ibid.* Tab. xxviii.) Fig. 30, a male skull, from a Franconian grave, (*ibid.* Tab. xxxvii.) I must also refer to Tab. iv, xvi, xxii, and xxvi, in my *Crania Germaniæ*, which all more or less present the described form. There is also a skull of this form delineated in Davis and Thurnam's *Crania Britannica*, Tab. 30 (cranium of an old Roman female). I am inclined to think that the Roman skull, Tab. 36, is that of a female.* Less expressed is the female character in the female skull from an Anglo-Saxon grave of Long Wittenham (Tab. 47). To this belongs also the ♀ skull, Tab. iii, in Thurnam,† from the long barrows of Tilshead, the height and length index of which is only .65, and Thurnam draws particular attention

* We have allowed the references to remain, to enable the student to consult the original edition.

† Fig. 27, female skull (Black Forest); fig. 28, female skull (from Franconian grave).

‡ Thurnam "On the Two Principal Forms of Ancient British and Gaulish Skulls."—*Mem. Anthropol. Soc. of London*, vol. i.

to the flat depressed vertex. In the same treatise, p. 18, there is a drawing of a female skull from the Meudon dolmen.*

The characteristic cranial profile described above may also be seen in living, especially handsome, female heads; and whosoever has once paid attention to these peculiarities, will generally find them. I add, in confirmation of what has been said, in Fig. 31, an outline of the profile of the head, the skull of which is drawn in Fig. 27, in which, compared with the figured female skull, the profile perfectly agrees. We need not be surprised that we do not find this female type equally pronounced in every head, just as little as we find in every male figure the masculine habitus. But that this form occurs so well pronounced in heads which we designate beautiful and womanly, proves that this form is typical for the female sex.

As may be expected, we find the treated-of differences in the male and female skulls as regards the profile rendered by art. The comparison cannot, in the antique heads, be easily instituted, on account of the hair-dress.† On recently visiting the Museum of Antiquities of Carlsruhe, the female cranial type appeared to me well pronounced in some modern plaster works, as in the head of Victoria, by Rauch, Helena, by Canova; the Three Graces, by Germain Pilou; a female head of Sabine Steinbach, &c. But I find that the characters I have dwelt upon are best marked in Flaxman's illustrations to Homer's Iliad and Odyssey, and to the tragedies of Æschylus, based upon an accurate study of the antique. I adjoin some outlines for comparison. Fig. 32, a female head (Æschylus, "The Suppliants," tab. iv); fig. 34, the head of Venus (Iliad, tab. xxxvii); and fig. 35, a male head (Iliad, tab. ii.)‡

On comparing the female cranial profile with the infantile, it is undeniable that they nearly approach each other; and what the proportional theory of artists and the measurements of Welcker teach us, namely, that the female skull in its proportions stands intermediate between the male and infantile skull, is equally correct with reference to the proportion we have treated of. The infantile skull shows the same height and length index as the female, namely, 70·1 (Welcker, *loc. cit.*, p. 67); the angular transition of the flat vertex into the perpendicular forehead is very plainly seen.

The question might, therefore, very properly be raised, whether the

* Fig. 29, male skull (from the Black Forest); fig. 30, male skull (from a Franconian grave).

† The observation of Welcker (*loc. cit.*, p. 66, note 2) I consider perfectly correct; I nevertheless believe that the object of the hairdress in the masculine-looking female crania was to give more elevation to the vertex, rather than the shortening of the longitudinal diameter.

‡ Figs. 32, 33, 34—32 to 34 female profiles; fig. 35, male profile.

female skulls described by me were not all belonging to very young subjects, and that they present that particular form, not because they were female skulls, but because they belonged to young girls. I at first raised that objection myself, but it was soon refuted by the fact that I met this form in skulls of all ages. The female type prevails through the whole life, or, expressed in other terms, the female type arises therefrom, that the infantile type persists beyond the limits of infancy.

That the knowledge of the cranial contour described in this paper, as conditioned by sex, is not without importance in researches of comparative and historical anthropology, can scarcely be contested. I have already, in another place (*Crania Germaniæ*), expressed a conjecture that probably most of the skulls which induced the Swiss naturalists, His and Rüttimeyer, to establish their *Belair-type*, were female skulls. With reference to other peculiarities of the female skull pointed out by Welcker, I shall not enter upon here, as they have no direct relation to the peculiarity of the cranial contour treated of in this paper.

The anatomical conditions of the female skull to which I wished to draw attention, may be summarised as follows:—

1. The slight elevation of the cranium.
2. The flattening of the vertical region.
3. The perpendicular forehead, the result of the predominance of the cranial roof over the cranial base.
4. The peculiar (No. 6) described form of the cranial contour, a consequence of the peculiarities described in Nos. 2, 3, and 4.

LESLEY'S ORIGIN AND DESTINY OF MAN.*

THIS book, which proceeds from the pen of an American writer, deserves our attention, although the extensive range of subjects it embraces prevents our treating fully of its contents. A difficulty of another kind moreover presents itself. Mr. Lesley's work is entitled "Man's Origin and Destiny," and we naturally expect to find the author's final conclusions embodied in a chapter on Man's *destiny*, as deduced from principles established as to his origin. This chapter,

* *Man's Origin and Destiny*. By T. P. Lesley, Member of the National Academy of the United States. London: N. Trübner and Co., 1868.